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# A Producers Guide to Preventing Predation of Livestock

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## Mission

The mission of the Animal Damage Control (ADC) program is to provide leadership in the science and practice of wildlife damage control to protect America's agricultural, industrial, and natural resources and to safeguard public health and safety. The ADC program has cooperative agreements with Federal, State, and county agencies, and other cooperators and uses an integrated management method to carry out this mission.

## Introduction

Livestock husbandry practices and other management techniques can help prevent or reduce predation by coyotes, dogs, foxes, bears, bobcats, and mountain lions. Sheep and goats are considered most vulnerable to predators, although poultry, cattle, hogs, horses, and exotic game animals are often subject to predation in many areas of North America. This pamphlet deals primarily with protecting sheep and goats, but the information in it can be applied to other livestock as well.

Livestock husbandry practices are implemented by the livestock producer;

however, additional assistance can be provided by the U.S. Department of Agriculture's (USDA) ADC program, which is part of the Animal and Plant Health Inspection Service (APHIS). ADC employs professional wildlife biologists and technicians who have expertise in handling predation problems. In addition, the Cooperative Extension Service at many universities has livestock specialists or wildlife damage specialists who can offer advice. These specialists and county Extension agents provide technical advice and support on management of livestock in the majority of U.S. counties.

## Identifying Predation and the Predator Species

Livestock die from various causes. Accurately determining the cause of death is sometimes difficult, but is important for implementing appropriate actions to minimize loss. Producers can sometimes determine the cause of death by examining livestock carcasses and the area around the death site. Sometimes expert assistance from a veterinarian, Extension specialist, or ADC specialist is necessary to assess the situation accurately. Indecisive action in detecting loss, identifying the cause, and correcting the problem often leads to an additional loss of animals, especially when predators are responsible.

An important first step is to observe the flock and count animals periodically. Livestock that have been repeatedly attacked by predators are more alert and nervous, display uncharacteristic fear, and may be scattered. Casual observation alone is often insufficient to detect whether predation has occurred. Lambs can be carried away from the area by predators. In these instances, the absence of an animal may be the only evidence that predation has taken



ADC employees work with other Federal, State, and local officials to determine the particular wildlife species responsible for predation. APHIS photo by Guy Connolly.



A study by USDA's National Agricultural Statistics Service indicated that predators caused losses worth an estimated \$27.4 million to sheep and goat producers in 1990. APHIS photo by Guy Connolly.

place. Vegetation and topography may hide a dead animal or a kill site from anything less than a thorough search.

The mere presence of predator tracks or droppings near a carcass is not sufficient evidence that predation has taken place, because many predator species scavenge on livestock carcasses. Other evidence around the site and on the carcass must be carefully examined. Signs of a struggle, scrapes or drag marks on the ground, broken vegetation, or blood scattered around the site may indicate predation. Livestock remains found at a kill site vary greatly depending on how recently the kill was made, the weather, the size of the animal killed, and the number and species of predators that fed on the animal.

One key in determining how a sheep was killed is the presence or absence of bruises under the skin at the attack point. Bites to a dead animal will not produce hemorrhage, but bites to a live animal will. If enough of the carcass is available, carefully skinning out the neck and head will allow observation of tooth punctures and bruises around those punctures. Talon punctures from large birds of prey will also cause hemorrhage in a live animal and are

usually found on the top of the head, neck, or back. Bruises become less reliable with increased age of the carcass and with scanty or scattered remains.

Coyotes typically attack sheep and goats at the throat, whereas dogs frequently are indiscriminate in how and where they attack. Dogs occasionally attack sheep and goats the way coyotes do, and young or inexperienced coyotes may attack any part of the body as dogs would. Distinguishing between dog and coyote attacks is difficult without also looking at the size and shape of tracks. Generally, the results of a dog attack are ripped skin and muscles in the flank, hindquarters, and head. Small predators, such as coyotes, foxes, and eagles, often select lambs over adult sheep.

Predators such as coyotes, dogs, bears, and mountain lions may kill more than one animal in a single attack episode, but often the predator feeds on only one of the animals. Each predator has a method and pattern of killing and feeding that may aid in identifying it. Coyotes, foxes, mountain lions, and bobcats usually feed on the viscera and organs such as the liver, heart, and lungs before feeding at the flanks or

behind the ribs. Mountain lions often cover a carcass with debris after feeding on it. Bears generally prefer meat to organs but may eat the udder from lactating ewes before consuming their flesh. Eagles skin carcasses and leave much of the skeleton intact on larger animals. With lambs, eagles may bite off and swallow the ribs. Feathers and droppings are usually present where an eagle has fed.

Accurate determination of the occurrence of predation and identification of the responsible species require knowledge and experience. Evidence must be gathered, pieced together, and evaluated according to predators found in the area, time of day, season, and other variables. Sometimes, even experts cannot absolutely confirm the cause of death, and it may be necessary to rely upon circumstantial information.

For more information to identify predators, contact your local wildlife conservation officer, USDA Extension Service office, or APHIS ADC office.

## Minimizing Predation

Livestock management practices and predator control methods can effectively reduce livestock losses. Each technique has advantages; some practices are suitable for individual producers while others may not be practical. It is important to evaluate all information and practices carefully since every situation is unique and different methods may be required.

### Livestock Husbandry

Total confinement—not allowing livestock out on pasture—may prevent predation, but this practice is not feasible for most producers. However, penning livestock at night is sometimes practical to reduce losses to predators. Lighting the corral at night may frighten some predators away, while providing producers the additional benefit of being able to see predators that come into the pen. However, the lights may attract roaming dogs to the stock. Livestock quickly adapt to lights and are not adversely affected.

The fact that spring lambing coincides with coyote birthing can lead to high predation because coyotes need to feed their pups. Lambing, calving,

and kidding in sheds will usually prevent predation and also reduce newborn losses due to inclement weather.

Because of their size and lack of strength, young livestock are especially vulnerable to predators during spring and summer. Altering spring calving, lambing, and kidding seasons may reduce losses of young animals to predators. Presence of a herder can also help reduce predation.

Producers can avoid using pastures with a history of predation. Pastures closer to buildings and human activity can be safer for young livestock. Pastures with rough topography or dense vegetation borders tend to provide predators with advantageous cover.

Removing livestock and poultry carcasses by burying, incinerating, or rendering so predators cannot feed on them may reduce predator activity in certain instances. This practice may be practical only where groups of small operators can cooperate to maintain a carcass-free area large enough to be effective.

Some producers put bells on their sheep to discourage predators, although

there are no data to firmly establish the merits of this approach. Bells might be useful in locating sheep or for alerting the producer to disturbances in the flock.

Trucking, rather than trailing, sheep to distant pastures may be wise in situations when trailing would bring sheep into areas where predators are more abundant. In addition, the use of herding dogs to manage sheep may discourage some predators from approaching the flock. Likewise, farm dogs may also deter predators.

### Fences

Excluding coyotes by fencing, especially in large areas, is very difficult. Some coyotes learn to dig deeper or climb higher to defeat a fence. Nevertheless, recent improvements in equipment and design have made fencing an effective and economically practical method for protecting sheep from predation under some grazing conditions.

Net-wire fences in good repair will deter many coyotes from entering a pasture. Openings in the mesh should measure less than 6 inches high and

less than 4 inches across. Barbed wire at ground level or a buried wire apron, an expensive option, will discourage digging under the fence. The fence should be about 5.5 feet high to hinder



This 12-strand fence with alternate charged and grounded wires protects sheep from predation. APHIS photo by Sam Linhart.

animals' jumping over. Climbing can usually be prevented by adding a charged wire at the top of the fence or installing a wire overhang.

Electric fencing is an effective method for protecting livestock from predation. Today's electric fence chargers have high output (5,000 volts or more), are resistant to grounding, present a minimal fire hazard, and are generally safe for livestock and humans. The fences are usually constructed of smooth wire stretched to a tension of up to several hundred pounds. Fence designs incorporate various strand patterns and electrification configurations (all charged or alternately charged wires).

The success of various types of fencing in excluding predators ranges from zero to 100 percent. Density and behavior of coyotes, terrain and vegetative conditions, availability of prey, size of pastures, season of the year, design of the fence, quality of construction, maintenance, and other factors interplay in determining how effective a fence will be. Fencing is most likely to be cost effective when the potential for predation is high, where there is potential for a high stocking rate, or where existing fences can be electrified.

Fencing is more effective when incorporated with other means of predation control. For example, guarding dogs (discussed later) and fencing have been used together to achieve a greater degree of success than either method used alone. Fencing can also be used to concentrate predator activity at specific places, such as gateways, ravines, or other areas where the predators try to gain access. Traps and snares can often be set at strategic places along a fence to capture predators effectively. Where practical, fencing is one of the most beneficial investments in predator damage control and livestock management.

Because predator exclusion fences may restrict movement of other wild species, particularly large game animals, Federal or State regulations may prohibit construction of effective fences in some areas.

For more information on fencing, contact your local county Extension office.

## **Guarding Animals**

A growing number of livestock producers are using guarding animals as part of their program of predation management. Guarding animals include

dogs, donkeys, cattle, llamas, goats, and mules. Heading the list of animals used are dogs of various Eurasian breeds. A good livestock guarding dog stays with the animals without harming them and aggressively repels predators. The dog chooses to remain with

livestock because it has been raised with them. Its protective behaviors are largely instinctive, and there is little formal training other than timely correction of undesirable behaviors (e.g., chewing on the ears of sheep,

overplayfulness, wandering). A guarding dog is not a herding dog but rather a full-time member of the flock.

Livestock-guarding dogs mature slowly and display independent behavior. Research and producer surveys have revealed no significant differences in success between sexes, but breed differences have been noted. Great Pyrenees dogs are the most widely used and have proven to be quite successful, although they are the least aggressive of the guarding breeds. Other breeds are more aggressive, but some also injure more livestock as the pups are raised. Research and producer surveys indicate that two-thirds to three-fourths of the dogs used are successful.

The optimum age to acquire a pup is between 7 and 8 weeks. The pup should be separated from littermates and placed with sheep or goats, preferably lambs or kids, in a pen or corral from which it can't escape. This socialization period should continue until the pup is about 16 weeks old, at which time the pup can be released into a larger pasture to mingle with the other sheep or goats.

Dogs have been effective on open rangeland or in fenced pastures, but management strategies differ depending



Here, an Akbash dog guards his flock. USDA photo 88BW2057-27 by Jeff Green.

on each situation. The characteristics of each livestock operation dictate the number of dogs required for effective protection from predators. If predators are scarce, one dog will be sufficient for most pasture operations. Range operations often use two dogs for each band of sheep. Sheep that flock and form a cohesive unit, especially at night, can be protected by one dog more effectively than sheep that are continually scattered and bedded in a number of locations.

Donkeys are gaining in popularity and use as protectors of sheep and goat flocks in the United States. A recent survey showed that in Texas alone, over 2,400 of the 11,000 sheep and goat producers have used donkeys as guardians. Donkeys are generally docile around people but seem to have an inherent dislike for dogs and, presumably, other canids, including coyotes and foxes.

Reported success of donkeys in reducing predation is highly variable. Improper husbandry or rearing practices and unrealistic expectations probably account for many failures. Here are

some key points in using a donkey for predation control:

- Use only a jenny or gelded jack (intact jacks can be too aggressive to the livestock).
- Use only one donkey for each group of sheep (the exception may be a jenny with a foal).
- Allow about 4 to 6 weeks for a naive donkey to bond to sheep.
- Remove the donkey during lambing to prevent accidental injuries to lambs.
- Test a new donkey's response to canids by challenging it with a dog in a pen or small pasture. Don't use donkeys that reacted passively during this test.
- Use donkeys in small, open pastures.
- Use donkeys with small flocks (less than 300 head of sheep).
- Avoid livestock feeds containing anabolic agents, which are poisonous to donkeys.

Research shows that bonding sheep to cattle can provide some protection to the sheep from predation by coyotes. Llamas, with their inherent dislike for canids, can also be useful for

predation control. Any animal that displays aggressive behavior to intruding predators may offer some benefit in deterring predation.

For more information on guarding animals, contact any APHIS ADC office.

### **Repellants and Frightening Devices**

Use of repellants and frightening devices is based on the idea that predators are repelled by new or strange odors, sights, or sounds. While the concept has a sound basis, predators can adapt to new repellants and devices quite rapidly. Changing repellants from time to time is most effective. Sound repellent devices include propane cannons, horns, sirens, and radios with sound amplifiers. These can be effective and are often used as temporary aids to protect livestock or poultry.

Combinations of methods, particularly sound and sight repellants, are more effective than single methods. The Electronic Guard, a device developed and evaluated by APHIS' Denver Wildlife Research Center, combines a flashing strobe light and a siren, with light and sound varied by an electric timer. The Center's information indicates that the combination of light

and sound tends to be more effective in repelling coyotes, especially when the devices are moved to different locations in pastures to add further variety.

Some individuals advocate the use of taste aversion (aversive conditioning)

to control coyote predation. The process involves treating sheep meat with lithium chloride. When coyotes eat the treated meat, they become nauseated. The presumption is that coyotes eating treated sheep baits will come to

associate sheep flavor with illness and then will not attack, kill, or feed on live sheep. No conclusive evidence has shown that taste aversion can effectively reduce coyote predation. No aversive chemicals are registered for coyote control at this time in the United States.

For more information on the Electronic Guard or sight and sound repellants, contact APHIS' Pocatello Supply Depot, 238 E. Dillon St., Pocatello, ID 83201, (208) 236-6920.



The portable, timer-activated Electronic Guard, suspended from an overhanging branch, turns itself on at dusk and off at dawn. APHIS photo by Laurie Smith.

## Integrated Predation Management

Combining various livestock management practices is often called integrated management, and combining two or more predator control methods may be termed integrated predation management.

When livestock management practices and nonlethal control are not sufficient to reduce predation to acceptable levels, removal of predators may be necessary. Lethal control methods include trapping or snaring, calling and shooting, aerial hunting, den hunting (locating predator dens to remove pups), and toxicants such as M-44

sodium cyanide devices and Compound 1080 in a livestock protection collar.

Most predators, especially coyotes, are adaptable creatures, and they may learn to circumvent many of the methods used to keep them from preying upon livestock. Consequently, a variety of control methods must be available. Most producers employ from one to a dozen control techniques to protect their stock. Successful ones use an integrated approach, combining good husbandry practices with electric fences, guarding dogs, trapping, shooting, or mechanical scare devices in whatever combination solves the problem.

## Economics of Control

Every producer must balance cost and benefit to maintain a profitable operation. Producers experiencing consistently low economic losses because of predators would not be wise to make a large investment in protecting their flocks from predation. On the other hand, producers suffering significant economic loss annually to coyotes, dogs, or other predators may benefit financially from learning how to identify and quickly stop damage and instituting a damage-prevention program. Investment depends on the cause and degree of loss anticipated. Producers should make precise calculations concerning the economic feasibility of predation prevention.

## Further Information

For more information on methods for preventing or controlling wildlife damage, contact the APHIS Animal Damage Control office in your State. For the address and telephone number in your area, call (301) 436-8281.

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